

Chapter 10: Alternative Regulatory Options

INTRODUCTION

EPA defined and evaluated a number of alternative best technology available (BTA) options for facilities subject to the final section 316(b) New Facility Rule. This chapter presents four alternative options that EPA considered for the final regulation and their costs:

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- ▶ **(1) Water Body Type Option:** This option would establish technology-based performance requirements based on the type of water body from which the facility withdraws cooling water. Intake capacity limits based on closed-cycle recirculating wet cooling systems would be required only in estuaries, tidal rivers, the Great Lakes, and oceans.
- ▶ **(2) Dry Cooling Option:** This option would establish technology-based performance requirements based on a near-zero intake level for all electric generators. Manufacturing facilities would have the same requirements as under the final rule.
- ▶ **(3) Industry Two-Track Option:** This option is a variation of the two-track approach of the final rule, suggested by industry representatives. The option would establish technology-based performance requirements different from the final rule, but employ a similar fast track and a demonstration track approach.

In addition to recirculating requirements, all the options, except for the dry cooling option, would also require:

- ▶ a design through-screen velocity of 0.5 ft/s;
- ▶ location- and capacity-based flow restrictions proportional to the size of the water body (such as a requirement for streams and rivers allowing no more than five percent withdrawal of the mean annual flow);
- ▶ design and construction technologies to minimize impingement and entrainment and to maximize survival of impinged organisms;
- ▶ post-operational monitoring of impinged and entrained organisms;
- ▶ monitoring of the through-screen velocity; and
- ▶ periodic visual inspections of the intake structures.

10.1 WATER BODY TYPE OPTION

Under the first alternative regulatory option, EPA would establish requirements for minimizing adverse environmental impact (AEI) from cooling water intake structures (CWIS) based on the type of water body in which the intake structure is located, the location of the CWIS in the water body, the volume of water withdrawn, and the design intake velocity. EPA would establish additional requirements or measures for location, design, construction, or capacity that might be necessary for minimizing AEI. For intakes located in marine water bodies (i.e., estuaries, tidal rivers, oceans) and the Great Lakes, this option would require intake flow reduction commensurate with the level that can be achieved using a closed-cycle recirculating wet cooling system. For all other water body types, the only capacity requirements would be proportional flow reduction requirements. In all water bodies, velocity limits and a requirement to install design and construction technologies would apply.

This option would also include a requirement for all new facilities to complete a one-year baseline biological characterization study prior to submitting an application for a permit. This study would detail the potential design and construction technologies that would apply to all new facilities. EPA rejected this option primarily because the technology to reduce flow to a level commensurate with a closed-cycle recirculating wet cooling system is available and is economically practicable across all water body types.

Table 10-1 shows the estimated compliance costs of the Water Body Type Option. The present value of total compliance costs is estimated to be \$450 million. The 83 electric generators account for \$363 million of this total, and the 38 manufacturing facilities for \$87 million. Total annualized cost for the 121 facilities is estimated to be \$36 million. Of this, \$29 million would be incurred by electric generators and \$7 million by manufacturing facilities.

Table 10-1: National Costs of Compliance of Water Body Type Option							
Industry Category (Number of Facilities Affected)	One-Time Costs		Recurring Costs				Total ^a
	Capital Technology	Initial Permit Application	O&M	Energy Penalty	Permit Renewal	Monitoring, Record Keeping & Reporting	
Total Compliance Costs (present value, in millions \$2000)							
Electric Generators (83)	\$62.3	\$1.6	\$80.2	\$175.1	\$1.0	\$42.8	\$363.0
Manufacturing Facilities (38)	\$26.3	\$0.8	\$36.0	\$0.0	\$0.6	\$23.7	\$87.4
Total (121) ^a	\$88.6	\$2.4	\$116.2	\$175.1	\$1.6	\$66.4	\$450.3
Annualized Compliance Costs (in millions \$2000)							
Electric Generators (83)	\$5.0	\$0.1	\$6.5	\$14.1	\$0.1	\$3.4	\$29.3
Manufacturing Facilities (38)	\$2.1	\$0.1	\$2.9	\$0.0	\$0.0	\$1.9	\$7.0
Total (121) ^a	\$7.1	\$0.2	\$9.4	\$14.1	\$0.1	\$5.4	\$36.3

^a Individual numbers may not add up to total due to independent rounding.

Source: U.S. EPA, 2001a; U.S. EPA, 2001b; U.S. EPA analysis 2001.

10.2 DRY COOLING OPTION

The second alternative option considered by EPA would impose more stringent compliance requirements on the electric generating segment of the industry. It is based in whole or in part on a zero intake-flow (or nearly zero, extremely low-flow) requirement commensurate with levels achievable through the use of dry cooling systems. Dry cooling systems use either a natural or a mechanical air draft to transfer heat from condenser tubes to air. New manufacturing facilities would not be subject to these stricter requirements but would have to comply with the standards of the final rule.

This option would include very minor permitting requirements and require no baseline biological characterization study prior to submission of the application for a permit, due to the requirement of near-zero intake. However, it would carry high capital and operating and maintenance costs, and large energy penalty. While a dry cooling requirement may be appropriate in specific cases, EPA rejected this option as a national requirement because of the large per-facility costs.

Table 10-2 shows the estimated compliance costs under the Dry Cooling Option. The option is the most expensive of the regulatory alternatives considered by EPA. Under this option, the present value of total compliance costs is estimated to be approximately \$6 billion. Total annualized cost for the 121 facilities is estimated to be \$491 million. Manufacturing facilities would incur the same compliance costs as under the proposed rule, \$13 million. The 83 electric generators, however, would face considerably higher costs with approximately \$478 million annually, or \$5.8 million per facility.

Table 10-2: National Costs of Compliance of Dry Cooling Option							
Industry Category (Number of Facilities Affected)	One-Time Costs		Recurring Costs				Total ^a
	Capital Technology	Initial Permit Application	O&M	Energy Penalty	Permit Renewal	Monitoring, Record Keeping & Reporting	
Total Compliance Costs (present value, in millions \$2000)							
Electric Generators (83)	\$1,403.0	\$0.2	\$3,617.0	\$907.4	\$0.2	\$0.0	\$5,927.8
Manufacturing Facilities (38)	\$47.2	\$16.9	\$71.5	\$0.0	\$1.8	\$23.8	\$161.1
Total (121) ^a	\$1,450.2	\$17.1	\$3,688.5	\$907.4	\$2.0	\$23.8	\$6,088.9
Annualized Compliance Costs (in millions \$2000)							
Electric Generators (83)	\$113.1	\$0.0	\$291.5	\$73.1	\$0.0	\$0.0	\$477.7
Manufacturing Facilities (38)	\$3.8	\$1.4	\$5.8	\$0.0	\$0.2	\$1.9	\$13.0
Total (121) ^a	\$116.9	\$1.4	\$297.2	\$73.1	\$0.2	\$1.9	\$490.7

^a Individual numbers may not add up to total due to independent rounding.

Source: U.S. EPA, 2001a; U.S. EPA, 2001b; U.S. EPA analysis 2001.

10.3 INDUSTRY TWO-TRACK OPTION

EPA also considered a two-track option as suggested by industry. A two-track option provides flexibility to the permittee in that the facility may choose to comply by meeting the specific technology-based performance requirements defined in the “fast track” (Track I), or by demonstrating the same level of performance as the Track I requirements under the “demonstration track” (Track II).

Under this regulatory option, a facility choosing Track I would install “highly protective” technologies in return for expedited permitting without the need for pre-operational or operational studies. Such fast-track technologies might include technologies that reduce intake flow to a level commensurate with a wet closed-cycle cooling system and that achieve an average approach velocity of no more than 0.5 ft/s, or any technologies that achieve a level of protection from impingement and entrainment within the expected range for a closed-cycle cooling system (with 0.5 ft/s approach velocity). This option was intended to allow facilities to use standard or new technologies that have been demonstrated to be effective for the species of concern, type of water body, and flow volume of the cooling water intake structure proposed for their use. Examples of candidate technologies include:

- ▶ wedgewire screens, where there is constant flow, as in rivers;
- ▶ traveling fine mesh screens with a fish return system designed to minimize impingement and entrainment; and
- ▶ aquatic filter barrier systems, at sites where they would not be rendered ineffective by high flows or fouling.

The operator of a proposed new facility would elect which set of technologies to install and validate its performance as necessary. In return, the permitting agency would not require additional section 316(b) protective measures for the life of the facility.

Track II would provide a facility that does not want to commit to any of the above technology options with an opportunity to demonstrate that site-specific characteristics, including the local biology, would justify another cooling water intake structure technology, such as once-through cooling. For these situations, the facility could demonstrate to the permitting agency, on the basis of site-specific studies, either that the proposed intake would not create an appreciable risk of AEI or, if it would create an appreciable risk of AEI, that the facility would install technology to “minimize” AEI.

EPA rejected the industry two-track approach because EPA prefers a more concrete and objective measure of BTA for minimizing AEI for the New Facility Rule than does the measure suggested by the industry.

Table 10-3 shows the estimated compliance costs under the Alternative Two-Track Option. Under this option, the present value of total compliance costs is estimated to be \$309 million. The 83 electric generators account for \$245 million of this total, and the 38 manufacturing facilities for \$64 million. Total annualized cost for the 121 facilities is estimated to be \$25 million. Of this, \$20 million will be incurred by electric generators and \$5 million by manufacturing facilities.

Table 10-3: National Costs of Compliance of Industry Two-Track Option							
Industry Category (Number of Facilities Affected)	One-Time Costs		Recurring Costs				Total ^a
	Capital Technology	Initial Permit Application	O&M	Energy Penalty	Permit Renewal	Monitoring, Record Keeping & Reporting	
Total Compliance Costs (present value, in millions \$2000)							
Electric Generators (83)	\$27.1	\$4.1	\$31.4	\$175.1	\$1.3	\$5.9	\$244.8
Manufacturing Facilities (38)	\$14.4	\$9.0	\$18.7	\$0.0	\$0.9	\$20.7	\$63.7
Total (121) ^a	\$41.5	\$13.1	\$50.1	\$175.1	\$2.2	\$26.6	\$308.5
Annualized Compliance Costs (in millions \$2000)							
Electric Generators (83)	\$2.2	\$0.3	\$2.5	\$14.1	\$0.1	\$0.5	\$19.7
Manufacturing Facilities (38)	\$1.2	\$0.7	\$1.5	\$0.0	\$0.1	\$1.7	\$5.1
Total (121) ^a	\$3.4	\$1.1	\$4.0	\$14.1	\$0.2	\$2.1	\$24.9

^a Individual numbers may not add up to total due to independent rounding.

Source: U.S. EPA, 2001a; U.S. EPA, 2001b; U.S. EPA analysis 2001.

10.4 SUMMARY OF ALTERNATIVE REGULATORY OPTIONS

Although the Agency considered numerous regulatory options during rule development, three primary regulatory options were evaluated in detail and costed. Two of the options would be less stringent and less expensive than the final rule; one option would be considerably more stringent and expensive. The final rule will cost facilities \$48 million annually (see *Chapter 6: Facility Compliance Costs*). The least expensive option is the two-track option suggested by industry. This option would cost new electric generator and manufacturing facilities approximately \$25 million annually but was rejected because the measure for minimizing AEI is not very concrete or certain. The other less expensive option is the water body type option which would require cooling towers for those facilities withdrawing from marine water bodies and the Great Lakes. This option would cost approximately \$36 million annually but was rejected because the best technology available and economically practicable across all water body types is a closed-cycle recirculating wet cooling system. The dry cooling option is more stringent than the final rule. It is by far the most expensive option, costing approximately \$491 million annually, and was rejected as a national requirement because of the high per-facility cost.

EPA selected the final rule because it meets the requirement of section 316(b) of the CWA that the location, design, construction, and capacity of CWIS reflect the BTA for minimizing AEI, and it is economically practicable.

Table 10-4 shows the annualized compliance costs for the electric generators and manufacturers associated with the final rule and the three other regulatory options discussed in this chapter. The options are presented in order of decreasing cost.

Table 10-4: National Costs of Compliance with Alternative Regulatory Options			
Regulatory Option	Annualized Compliance Costs (in millions \$2000)		
	Electric Generators	Manufacturing Facilities	Total
Dry Cooling Option	\$477.7	\$13.0	\$490.7
Final Rule	\$34.7	\$13.0	\$47.7
Water Body Type Option	\$29.3	\$7.0	\$36.3
Industry Two-Track Option	\$19.7	\$5.1	\$24.9

^a Individual numbers may not add up to total due to independent rounding.

Source: U.S. EPA analysis, 2001.

REFERENCES

U.S. Environmental Protection Agency (U.S. EPA). 2001a. *Information Collection Request for Cooling Water Intake Structures, New Facility Final Rule*. October 2001.

U.S. Environmental Protection Agency (U.S. EPA). 2001b. *Technical Development Document for the Final Regulations Addressing Cooling Water Intake Structures for New Facilities*. EPA-821-R-01-036. November 2001.

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